Spontaneous subconjunctival haemorrhage – a sign of hypertension?

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Abstract

The relationship between the condition of spontaneous subconjunctival haemorrhage (SCH) and hypertension was investigated. Seventy eight patients with SCH and 78 controls with unrelated ophthalmic conditions were compared. Blood pressure (BP) was significantly higher at presentation in the group with SCH at 149 (SD 27)/89 (SD 15) versus 142 (SD 25)/81 (SD 12). The proportion of hypertensives by WHO criteria (systolic blood pressure >160 and/or diastolic blood pressure >95) was 46% on presentation compared with 23% of the control group. The morphology of the lesion did not influence the association with hypertension although there was a suggestion that the group with raised haemorrhages had a tendency to higher systolic blood pressure. It is recommended that all patients with SCH have their BP checked; this will result in the diagnosis of a significant number of new hypertensives.

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Subconjunctival haemorrhage (SCH) is a common condition. Definite associations of SCH include trauma (local trauma to the eye or skull base fractures) and conjunctivitis (as part of the inflammatory response). SCH is also recognised in whooping cough, crush injuries, or strangulation where the mechanism is thought to be raised venous pressure.[1] SCH presents more commonly as a spontaneous event without these aetiological factors especially in the elderly or arteriosclerotic.[2-5] It is sometimes stated that this is associated with hypertension[1 6-8] but there have been no detailed studies reported in the literature on the degree of association. In the present study we have measured blood pressure (BP) under standard conditions in patients presenting with spontaneous SCH and a control group and demonstrated that BP is significantly higher in the group with SCH.

Materials and methods

Seventy eight patients presenting with spontaneous SCH at the Glasgow Eye Infirmary, the Tennent Institute of Ophthalmology, and the Royal Alexandra Hospital, Paisley were recruited over a 9 month period. Each patient was assessed initially by an ophthalmologist and subsequently referred for assessment at the MRC Blood Pressure Unit (BPU). The data on each patient were collected independently and compared on completion of the study. A separate group of age-sex matched patients with blepharoconjunctivitis and minor trauma was recruited and in this group the examining ophthalmologist made an assessment of cardiovascular risk factors (as most of these patients were reluctant to attend for review).

INITIAL ASSESSMENT

SCH due to trauma or inflammatory disease was excluded. A history was taken to ascertain whether the patient attributed the haemorrhage to rubbing the eye or to a straining manoeuvre. The morphology of the haemorrhage was recorded, the intraocular pressure measured by Goldmann applanation tonometry, and the fundus examined for hypertensive changes. A single recording of sitting BP was made using a mercury sphygmomanometer.

SUBSEQUENT ASSESSMENT

Each patient was asked to attend the BPU 1 week following his or her initial presentation and 4 weeks after this. Of the SCH group 41 patients attended for the first review when a detailed medical history was obtained, but only 16 attended for second reviews. The blood pressure was measured using a semi-automatic digital sphygmomanometer (Copal, Takeda, Japan) after lying for 10 minutes and a mean of two readings was taken. It rapidly emerged that the control patients were not attending for review so that the protocol was changed to allow the ophthalmologist to assess cardiovascular risk factors in the controls at initial assessment.

Results

There were 78 patients in each group. For the SCH group the mean age was 53 years with a standard deviation of 17 years and a range of 13 to 87. For the control group the mean age was 51 with a standard deviation of 17 years and a range of 13 to 89; 59% of each group were male.

BLOOD PRESSURE

Table 1 shows mean values of systolic and

Table 1 Mean blood pressure at each visit

	Subconjunctival haemorrhage		*Control*	
	SBP (SD)	*DBP (SD)*	*SBP (SD)*	*DBP (SD)*
Presentation (n=78)	149 (27)	89 (15)	142 (25)*	81 (12)†
Follow-up 1 week (n=46)	147 (23)	86 (13)	–	–
Follow-up 5 weeks (n=16)	149 (27)	89 (15)	–	–

* p=0·09
† p<0·01

diastolic blood pressure at each visit. Diastolic BP was significantly higher in the SCH group and there was a similar trend in the systolic BP although this failed to reach statistical significance (p=0·09). For the 41 patients with SCH who attended for a second visit there was a correlation between the initial casual reading and the subsequent standardised one (r=0·53 (p<0·001) for systolic and 0·59 (p<0·001) for diastolic). In this subgroup mean BP fell from 154 (SD 26)/92 (SD 15) to 147 (SD 23)/86 (SD 13). Using the WHO criteria for the diagnosis of hypertension (SBP >160 and/or DBP >95)[9] the proportion of hypertensives was 46% at visit 1, 36% at visit 2, and 37% at visit 3. In the control group by comparison only 23% were hypertensive by these criteria.

Five of the patients with SCH and two of the controls fulfilling these criteria for hypertension were known hypertensives. A further seven patients with SCH and eight controls, recorded as high, were diagnosed hypertensives on treatment.

INTRAOCULAR PRESSURE

Intraocular pressure did not differ between the SCH group (15·7 (SD 3·1)) and the controls (15·7 (SD 4·1)) and there was no correlation between IOP and systolic or diastolic BP in either group.

CARDIOVASCULAR RISK PROFILE

Table 2 shows a comparison of the cardiovascular risk profile between the two groups. For reasons mentioned above there are 41 patients in the SCH and 78 patients in the control group for this comparison. There was no significant difference in cardiovascular risk profile with the exception of family history of vascular disease which was significantly higher in the SCH group.

FUNDUS CHANGES

For each patient the examining ophthalmologist was asked to grade the fundus changes from 0–4 by a modified Keith and Wagner classification. Mean fundus score was 0·63 (SD 0·09) for SCH versus 0·33 (SD 0·07) for the controls (p<0·01).

EYE RUBBING AND STRAINING MANOEUVRES

Eighteen patients reported minor antecedent events; their mean BP was 145 (SD 30)/87 (SD 15) compared with 150 (SD 26)/90 (SD 14) for the 60 patients with no causative history. This failed to reach statistical significance (p=0·47, systolic; 0·49, diastolic).

Table 2 Prevalence of cardiovascular risk factors in SCH and control groups. All differences insignificant by χ^2 test, with exception of family history of vascular disease (0·02<p<0·05)

	Subconjunctival haemorrhage (%) (n=41)	*Control (%) (n=78)*
HBP, personal history	15	12
HBP, family history	34	21
Vascular disease, personal history	5	14
Vascular disease, family history	51	29
Smoking	35	38
Diabetes	10	7

MORPHOLOGY OF SUBCONJUNCTIVAL HAEMORRHAGE

The examining ophthalmologist was asked to state whether the haemorrhage was flat or raised and whether it was bright or dark. There was found to be a mean systolic blood pressure of 145 (SD 27) (n=54) in the patients with a flat haemorrhage compared with 157 (SD 25) (n=24) for the patients with a raised haemorrhage. These results suggest that a raised haemorrhage is more likely to be suggestive of hypertension but the results do not reach statistical significance (p=0·079). The diastolic means were very close (88 for flat versus 92 for raised). There was no correlation between BP and whether the haemorrhage was bright or dark.

Discussion

Subconjunctival haemorrhage may present to the ophthalmologist, the general practitioner or, occasionally, to the hospital physician. Some authors recommend further investigation of these patients[5 7] while others suggest that reassurance alone is required.[10 11]

This study confirms that BP is higher in SCH than in a control group and that there is a high incidence of hypertension in patients with SCH referring themselves to the ophthalmologist which persists on subsequent assessment. This holds true even when the patient attributes the haemorrhage to eye rubbing or to a straining manoeuvre and whether or not the fundus shows early hypertensive changes. The appearance of the haemorrhage was a poor guide to the existence of hypertension with the exception that a raised haemorrhage is associated with a higher mean systolic blood pressure.

The BP recording at the time of presentation may be influenced by a number of factors including observer variability in measurement, anxiety, and the age of the patient. Observer variability in the initial reading seems to be a minor factor since there was a close correlation between first and subsequent (automated) blood pressure measurements. The controlled nature of this study should largely eliminate major influences occasioned by age and anxiety (with the caveat that SCH is an alarming condition, which may explain why the mean blood pressure fell by 7/6 mm Hg by the second visit and the proportion of hypertensives by WHO criteria fell from 46% to 36%).

Our results support the historical view that hypertension may cause SCH but contrast with the published work of Canning[12] who found in a retrospective study that only seven of 100 patients with SCH were hypertensive. (The diagnostic criteria for hypertension were not defined however and an additional 32% of haemorrhages were attributed to eye rubbing or Valsalva manoeuvres.)

It is also stated in the literature that SCH can be a feature of diabetes.[5 7 13] In our study there was no significant difference in the prevalence of

diabetes between SCH (10%) and controls (7%) and no new diabetics were diagnosed.

The significant difference in fundus scores between SCH and controls is difficult to interpret given the subjective nature of this assessment but may indicate a trend towards arteriopathy in patients with SCH, as may the increased frequency of a family history of vascular disease.

Our patients however had a relatively young mean age (55 (SD 15) years) which, combined with the relative infrequency of manifest cardiovascular disease, suggests that this is a group in which treatment might well be successful in preventing future cardiovascular events. The high incidence of hypertension by established criteria suggests that hypertension may be an important aetiological factor in SCH and we would recommend that all patients with this condition have their BP checked and be referred to the general practitioner. This will result in the diagnosis of a significant number of new hypertensives by the ophthalmologist.

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